CLAIMS

1. A system comprising:

a valve;

a plurality of RFID sensor assemblies coupled to the valve to monitor a plurality of parameters associated with the valve;

a control tag configured to wirelessly communicate with the respective tags that are coupled to the valve, the control tag being further configured to communicate with an RF reader; and

an RF reader configured to selectively communicate with the control tag, the reader including an RF receiver:

2. A system in accordance with claim 1 wherein the valve is a fluid-operated valve.

3. A system in accordance with claim 2 wherein the valve includes a valve positioner, an electrical conductor, and an I/P transducer coupled to the valve positioner by the electrical conductor, and wherein at least one of the plurality of RFID sensor assemblies is coupled to the electrical conductor.

4. A system in accordance with claim 2 wherein the valve includes a pneumatic actuator, a valve stem coupled to the pneumatic actuator, and an actuator-valve stem coupler, and wherein at least one of the plurality of RFID sensor assemblies is coupled to the actuator-valve stem coupler.

5. A system in accordance with claim 2 wherein the valve includes a pneumatic actuator, a valve positioner, and a fluid conduit in fluid communication between the pneumatic actuator and the valve positioner, and wherein at least one of the plurality of RFID sensor assemblies is coupled to the fluid conduit between the pneumatic actuator and the valve positioner.

6. A system in accordance with claim 2 wherein the valve includes a pneumatic actuator, a valve positioner, a booster, a first fluid conduit in fluid communication between the pneumatic actuator and the booster, a second fluid conduit in fluid communication between the booster and the valve positioner, and wherein at least one of the plurality of RFID sensor assemblies is coupled to the first fluid conduit and at least another one of the plurality of RFID sensor assemblies is coupled to the second fluild conduit.

7. A system in accordance with claim 6 and further comprising a fluid supply line in fluid communication with the booster, and wherein at least one of the plurality of RFID sensor assemblies is coupled to the fluid supply line.

8. A system in accordance with claim 7 and further comprising a regulator valve in fluid communication between the fluid supply line and the valve positioner, a conduit between the regulator valve and the valve positioner, and wherein at least one of the plurality of RFID sensor assemblies is coupled to the conduit between the regulator valve and the valve positioner.

9. A system in accordance with claim 1 and further comprising a conduit upstream of the valve and a conduit downstream of the valve, wherein at least one of the plurality of RFID sensor assemblies is coupled to the conduit upstream of the valve and at least another one of the plurality of the RFID assemblies is coupled to the conduit downstream of the valve.

10. A system in accordance with claim 1 wherein the valve includes a seat and wherein the RFID sensor assemblies are used to determine valve seating force.

11. A system in accordance with claim 1 wherein the valve includes a spring and wherein the RFID sensor assemblies are used to determine a spring preload of the spring.

12. A system in accordance with claim 1 wherein the valve includes a spring and wherein the RFID sensor assemblies are used to determine a spring constant of the spring.

13. A system in accordance with claim 1 wherein the valve includes a spring and wherein the RFID sensor assemblies are used to determine spring compression.

14. A system in accordance with claim 1 wherein the RFID sensor assemblies are used to determine a friction load on the valve.

15. A system in accordance with claim 1 wherein the RFID sensor assemblies are used to determine valve position.

16. A system in accordance with claim 1 wherein the RFID sensor assemblies are used to determine valve stroke times.

17. A sensor assembly comprising:

an RFID tag;

a thermocouple; and

a probe having first and second ends, the first end defining a tip, the thermocouple being supported on the tip, and the RFID tag being supported on the second end and electrically coupled to the thermocouple.

18. A sensor assembly in accordance with claim 17 wherein the probe defines an electrical conductor electrically coupling the RFID tag to the thermocouple.

19. A sensor assembly in accordance with claim 17 wherein the RFID tag includes memory and is configured to log measurements from the thermocouple, at different times, in the memory.

20. A plurality of RFID sensor assemblies for sensor use in industrial process control, the plurality comprising:

sensors configured to sense at least two of temperature, pressure, and strain;

at least one of the sensor assemblies including a band configured to encircle a fluid conduit; and

an RFID tag supported by the band and in electrical communication with at least one of the sensors.

21. A sensor assembly in accordance with claim 20 wherein the RFID tag includes memory and is configured to log data in the memory from the at least one sensor in electrical communication with the RFID tag, at different times.

22. A sensor assembly comprising:

an RFID tag;

a pressure sensor; and

a band configured to encircle a fluid conduit, the RFID tag being supported by the band and in electrical communication with the pressure sensor.

23. A sensor assembly in accordance with claim 22 wherein the RFID tag includes memory and is configured to log data from the pressure sensor in the memory at different times.

24. A method of monitoring an industrial process which makes use of a valve, the method comprising:

coupling a plurality of RFID sensor assemblies to the valve to monitor a plurality of parameters associated with the valve;

providing a control tag to wirelessly communicate with the respective tags that are coupled to the valve, the control tag being configured to communicate with an RF reader; and

selectively communicating with the control tag using an RF reader, the reader including an RF receiver.

25. A method in accordance with claim 24 wherein the valve is a fluid-operated valve, wherein the valve includes a valve positioner, an electrical conductor, and an I/P transducer coupled to the valve positioner by the electrical conductor, and wherein the method comprises coupling at least one of the plurality of RFID sensor assemblies to the electrical conductor.

26. A method in accordance with claim 24 wherein the valve is a fluid-operated valve, wherein the valve includes a pneumatic actuator, a valve stem coupled to the pneumatic actuator, and an actuator-valve stem coupler, and wherein the method comprises coupling at least one of the plurality of RFID sensor assemblies to the actuator-valve stem coupler.

27. A method in accordance with claim 24 wherein the valve is a fluid-operated valve, wherein the valve includes a pneumatic actuator, a valve positioner, and a fluid conduit in fluid communication between the pneumatic actuator and the valve positioner, and wherein the method comprises coupling at least one of the plurality of RFID sensor assemblies to the fluid conduit between the pneumatic actuator and the valve positioner.

28. A method in accordance with claim 24 wherein the valve is a fluid-operated valve, wherein the valve includes a pneumatic actuator, a valve positioner, a booster, a first fluid conduit in fluid communication between the pneumatic actuator and the booster, a second fluid conduit in fluid communication between the booster and the valve positioner, and wherein the method comprises coupling at least one of the plurality of RFID sensor assemblies to the first fluid conduit and coupling at least another one of the plurality of RFID sensor assemblies to the second fluild conduit.

29. A method in accordance with claim 28 wherein a fluid supply line is in fluid communication with the booster, and wherein at least one of the plurality of RFID sensor assemblies is coupled to the fluid supply line.

30. A method in accordance with claim 29 wherein a regulator valve is in fluid communication between the fluid supply line and the valve positioner, a conduit is between the regulator valve and the valve positioner, and wherein at least one of the plurality of RFID sensor assemblies is coupled to the conduit between the regulator valve and the valve positioner.

31. A method in accordance with claim 24 wherein a conduit is upstream of the valve and a conduit is downstream of the valve, wherein at least one of the plurality of RFID sensor assemblies is coupled to the conduit upstream of the valve and at least another one of the plurality of the RFID assemblies is coupled to the conduit downstream of the valve.

32. A method in accordance with claim 24 wherein the valve includes a seat and wherein the method comprises using the RFID sensor assemblies to determine valve seating force.

33. A method in accordance with claim 24 wherein the valve includes a spring and wherein the method comprises using the RFID sensor assemblies to determine a spring preload of the spring.

34. A method in accordance with claim 24 wherein the valve includes a spring and wherein the method comprises using the RFID sensor assemblies to determine a spring constant of the spring.

35. A method in accordance with claim 24 wherein the valve includes a spring and wherein the method comprises using the RFID sensor assemblies to determine spring compression.

36. A method in accordance with claim 24 and comprising using the RFID sensor assemblies to determine a friction load on the valve.

37. A method in accordance with claim 24 and comprising using the RFID sensor assemblies to determine valve position.

38. A method in accordance with claim 24 and comprising using the RFID sensor assemblies to determine valve stroke times.

39. A method of manufacturing a sensor assembly, the method comprising:

providing an RFID tag;

providing a thermocouple;

providing a probe having first and second ends, the first end defining a tip;

supporting the thermocouple on the tip, and

supporting the RFID tag on the second end and electrically coupling the RFID tag to the thermocouple.

40. A method in accordance with claim 39 and comprising using the probe to define an electrical conductor electrically coupling the RFID tag to the thermocouple.

41. A method in accordance with claim 39 wherein the RFID tag includes memory, the method comprising logging measurements from the thermocouple, at different times, in the memory.

42. A method of using a plurality of RFID sensor assemblies for sensor use in industrial process control, the method comprising:

providing a plurality of sensors configured to sense at least two of temperature, pressure, and strain;

providing a mechanical package to support at least one of the sensors and define a sensor assembly, the package including a band configured to encircle a fluid conduit; and

supporting an RFID tag by the band, in electrical communication with at least one of the sensors.

43. A method in accordance with claim 42 wherein the RFID tag includes memory, the method comprising configuring the RFID tag supported by the band to log data, at different times, in the memory from the at least one sensor supported by the band.

44. A sensor method comprising:

providing an RFID tag;

providing a pressure sensor;

providing a band configured to encircle a fluid conduit;

supporting the RFID tag by the band and placing the RFID tag in electrical communication with the pressure sensor.

45. A method in accordance with claim 44 wherein the RFID tag includes memory and is configured to log data from the pressure sensor in the memory at different times.